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RESEARCH SUMMARY

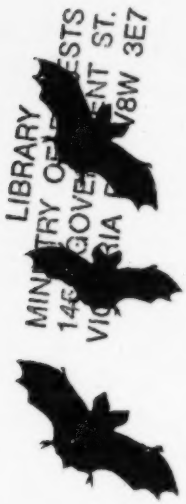
Feb. 1994 RS-013

forest sciences
NELSON FOREST REGION

Bat Research in the West Arm Demonstration Forest

Juliet Craig *

- **Research study examines effects of forest harvesting on bats**



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INTRODUCTION

The consideration of wildlife habitat in the planning of forest harvesting has become an important issue. Insights into the habitat requirements of forest-dwelling animals are essential if biodiversity is to be maintained. Although some mammals have been well-studied, little is known about the ecology of non-game species such as bats.

Bats are the second most diverse mammalian order, having 16 species in British Columbia. They use trees, caves, cliffs and human-made structures as roost sites. All species in B.C. consume only arthropods (mostly insects) and may eat the equivalent of their body weight in insects nightly. Bats survive the winter by hibernating in protected areas or migrating to warmer regions. They are the only mammal capable of true flight and have a well developed echolocation system. This sonar system enables them to detect prey and navigate in complete darkness by listening for the echoes of sounds they emit.

It is expected that at least 10 species of bats inhabit the Interior Cedar-Hemlock (ICH) and Engelmann Spruce-Subalpine Fir (ESSF) biogeoclimatic zones of the Nelson area (Nagorsen and Brigham 1993). These include:

- Big brown (*Eptesicus fuscus*)
- Silver-haired (*Lasionycteris noctivagans*)
- Hoary (*Lasiurus cinereus*)
- California (*Myotis californicus*)
- Western long-eared (*M. evotis*)
- Little Brown (*M. lucifugus*)
- Northern long-eared (*M. septentrionalis*)
- Long-legged (*M. volans*)
- Yuma (*M. yumanensis*)
- Townsend's big-eared (*Plecotus townsendii*)

Western small-footed bats (*Myotis ciliolabrum*) and Western Red bats (*Lasiurus blossevillii*) may also occur in these areas (Brigham 1993).

Of these bat species, Western Red and Northern long-eared are on the provincial red list (endangered) and Western small-footed and Townsend's big-eared are on the provincial blue list (threatened). Despite this status, there has only been one comprehensive study on bats in the Nelson area (Vonhof and Grindal 1993). Funded by Forestry Canada, it began in 1992 and will continue every summer for four years.

The study sites are located in the West Arm Demonstration Forest (WADF), Kootenay Lake Forest District (Research Summary RS-003, Forest Sciences Section 1992). The study was designed to gather information on distribution, abundance, diversity, roost site selection, diet, and foraging behaviour of bats. The WADF was chosen because bats could be studied in the same areas before and after harvesting. It is the first study to experimentally examine the impact of forest harvesting on bats.

Field research of the long-term study, like most bat studies in Canada, occurs during the summer months only. Information about bats in the fall is also valuable since this is when temperatures drop, insects become less abundant and bats hibernate or migrate. Yet fall data are scarce. This study was designed to supplement summer data by collecting information about species presence, diet, food abundance, and timing of hibernation and migration in the fall.

This 1993 fall study was funded by the Forest Sciences Section of the Ministry of Forests (Nelson Region), Natural Science and Engineering Research Council, and Simon Fraser University. The Universities of Calgary and Regina supplied equipment.

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RESEARCH METHODS

Field research was conducted between September and November, 1993, in the WADF and surrounding area. Presence and activity of bats were determined using QMC mini2bat detectors. These small devices allow high-frequency bat echolocation calls to be heard by an unaided human ear. Bats were also captured in mist nets to be identified, weighed, measured, and subsequently released. Fecal pellets from these bats were collected and dissected to identify the insects consumed, and their contents were compared to insects caught in light/suction traps.

RESULTS

The following results were generated from the fall study. Results from the long-term study are available from Robert Barclay or Mark Brigham.

- A total of 6 species were caught:
  - 13 Yuma (*Myotis yumanensis*)
  - 4 Little Brown (*M. lucifugus*)
  - 1 Long-legged (*M. volans*)
  - 1 Fringed (*M. thysanodes*)
  - 1 Big Brown (*Eptesicus fuscus*)
  - 1 Silver-haired (*Lasionycteris noctivagans*)
- A Fringed bat was caught, which, along with one spotted during the summer of 1993, confirms its presence in the area. This species is on the provincial blue list.
- Bats migrated or hibernated from the study sites at different times. These activities occurred primarily between September 28 and October 10.
- Bats were observed flying when temperatures were as low as 5° C.
- The latest bat activity was observed on the edge of the 'seed tree clearcut' in Redfish on November 1. This individual was thought to be a Big Brown bat.
- Ninety-seven percent of insects caught in the trap were *dipterans* (flies, midges, etc.) *Lepidopterans* (moths) represented 1.9% of the insects caught.
- The diet of Yuma bats included *diptera, lepidoptera trichoptera, hemiptera, oleoptera* and *hymenoptera.*
- No correlations were found between diet and food availability, indicating that Yuma bats fed selectively.
- Bats hibernated or migrated while insects were still available.

DISCUSSION

There is still much to be learned about bats and their habitat requirements. Questions about habitat use, roost trees, foraging sites, diet, and hibernaculum locations remain unanswered. Further information will be essential if bat habitat is to be considered when managing forests for biodiversity. Field work may continue to be extended into the fall months during the remainder of the long-term research project to gain more information. Continued efforts are being made to learn more about these mysterious flying mammals.

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